

Health Care Financing

Hospital Patient Origin and Destination Data for Medicare Patients 65 Years and Over

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Health Care Financing

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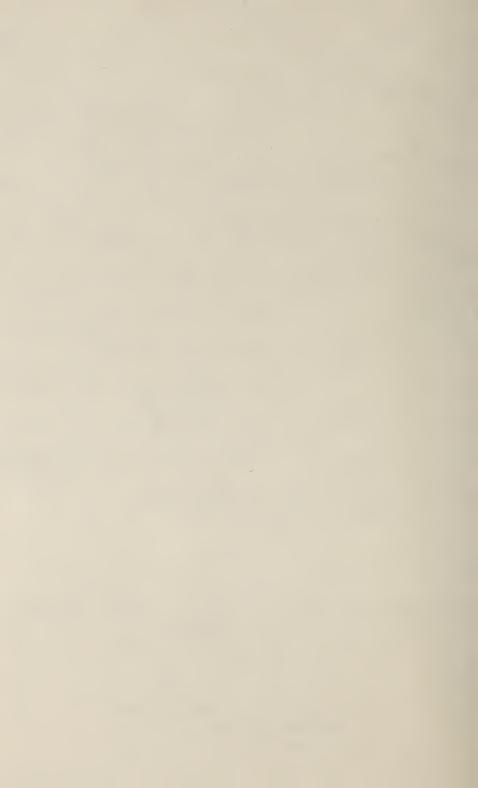
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Introduction

Beginning in 1978, hospital patient origin and destination data on Medicare beneficiaries have been produced by the Health Care Financing Administration (HCFA), Department of Health and Human Services (HSS). The series began with data for 1974. This paper describes the data and outlines their possible applications for health planning. The data have been produced by health service area and are being sent to each Health Systems Agency (HSA), State Health Planning and Development Agency (SHPDA), and Statewide Health Coordinating Council (SHCC). Each agency receives data on all HSAs in its HSS region. Agencies containing parts of two regions receive data for both regions.

The data were derived from the Medicare Statistical System and present information on the number of discharges and days of care provided to Medicare patients aged 65 years and over in short-stay hospitals (commonly called acute care hospitals). (Hospital stays of Medicare beneficiaries under age 65 enrolled in the disability por-

tion of Medicare are not included in the tables.)

Information on discharges and days of care is provided from two different perspectives: (1) for beneficiaries residing in a specific health service area, the health service areas in which they were hospitalized are shown (patient destination data) and (2) for hospital discharges in a specific health service area, the health service areas where the patients reside are shown (patient origin data).

Sources of the Data

The data are derived from three major Medicare program files—the health insurance master enrollment file, the provider of service file, and a hospital bill file. The health insurance master enrollment file contains data on demographic characteristics of Medicare beneficiaries and is the source of information on age, sex, race, and residence of the patient. The provider of service file contains data on hospital characteristics, including hospital location. The hospital bill file contains information from the billing forms submitted by hospitals and is the source of information on dates of admission and discharge. Data from all three files are combined to produce the Medicare patient origin and destination tables.

¹ Patient origin data at the hospital and county level for 1977 were sent to HSAs on October 1979. When possible, HCFA plans to produce patient origin and destination data below the health service area level.

The data reflect those final bills received and processed in the Medicare central office as of the date indicated in a footnote to the tables. Due to processing lags, data on discharges and days of care contain some shortfalls for all years. The shortfall for the last complete calendar year prior to the cutoff date is estimated to be about four percent nationally. The shortfall for smaller areas, such as health service areas, can vary substantially from this figure.

Limitations of the Data

A major limitation is that the data apply only to Medicare beneficiaries.² Thus, they should not be used as patient origin and destination information for the entire population, unless the planning agency has evidence that Medicare beneficiaries and the population-at-large follow the same patterns in that area.³ In addition, the data do not provide information on patient flow for individual hospitals or for departments within hospitals. The data reflect only stays in those short-stay hospitals reimbursable by Medicare and thus do not provide information on Veterans Administration, Public Health Service, military hospitals, or hospitals not certified by Medicare.

Other limitations of the data are related to information on the beneficiary's residence. Temporary or permanent changes of address are incorporated into the health insurance master enrollment file as beneficiaries report them. Whenever a beneficiary delays or neglects to notify the Social Security Administration of an address change, the data will reflect the old address rather than the current one.

Also, the beneficiary's place of residence is defined as the mailing address, which in some cases may not be the actual place of residence. In addition, for a small portion of beneficiaries in States with more than one health service area, the health service area of

² A substantial portion of hospitalizations occurring in the U.S. are represented in the tables. Persons aged 65 and over account for about one-fourth of the discharges and one-third of total days of care in non-Federal, short-stay hospitals. For additional information, see National Center for Health Statistics, HEW, "Utilization of Short-Stay Hospitals: Annual Summary for the United States, 1978," Vital and Health Statistics, Series 13, No. 46, March 1980.

³ A study in three New England States comparing Medicare patient origin data with patient origin data for the entire population showed that, in general, the same conclusions about patient flow were reached regardless of which source was used. See John E. Wennberg, MD., and Alan M. Gittlesohn, Ph.D., "A Small Area Approach to the Analysis of Health System Performance: A Practical Guide to Uses of Epidemiology for the Evaluation of Medical Markets", March 1980, work performed under contract #291-76-0003 with the Office of Planning and Evaluation, Health Resources Administration, Public Health Service, Department of Health and Human Services.

residence is unknown. In no State was this group more than 0.2 percent of total State enrollment; in most States the percent was much less.

It is important to note that the data are from a 20 percent sample of Medicare beneficiaries and thus are subject to sampling error. Estimates for sampling error are presented in the four tables in Appendix A. The appendix also explains the use of the standard error tables.

Description of the Tables

The tables present hospital patient origin and destination data for Medicare beneficiaries aged 65 and over. Data for each year represent hospital discharges occurring between January 1 and December 31 of the year.

For each HSS region there is one patient origin table and one patient destination table. The patient origin table shows, by health service area, the origin of patients for a particular health service area. Data are presented on numbers and percentages of both discharges and days of care. The patient destination table shows, by health service area, where the residents of a particular area are hospitalized. Data are presented on numbers and percentages of discharges and days of care. The discharge figures reflect counts of hospitalizations, not counts of persons hospitalized. Because some people have more than one hospital stay in a year, the number of discharges exceeds the number of persons hospitalized.

In the tables, health service areas are coded with the usual two-letter State abbreviation and a three-number service area code, e.g., "FL008." Some health service areas contain parts of two States. In the "Directory: Health Systems Agencies, State Health Planning and Development Agencies, and Statewide Health Coordinating Councils" issued by the Bureau of Health Planning, Health Resources Administration, these areas are assigned two codes, one for each State. In the patient flow tables, however, these areas are listed under only one code. Appendix B shows how interstate health service areas are listed.

Whenever a county is divided among more than one health service area, data system constraints demand that the entire county be placed in one health service area for data reporting purposes. Appendix B shows how split counties are assigned to health service areas.

Interpreting and Using the Tables

In interpreting and using the patient origin and destination tables, area-specific factors must be considered. When possible, data for the entire population as well as for the Medicare population should be considered. Examples of these factors include the following:

The number of Medicare beneficiaries residing in a health service area and neighboring areas and changes in Medicare enrollment over time.

 The demographic and socioeconomic characteristics of the elderly in the area and in neighboring areas.

• Locations of concentrations of the elderly and of hospitals

within the area and neighboring areas.

 Patterns of hospital use in the area and in neighboring areas, for example, rates of discharges and days of care, average length of stay, and bed-population ratios.

 Differences in services offered and in occupancy rates and hospital capacity in hospitals in the area and in neighboring

areas.

 The availability and accessibility of ambulatory care and longterm care in the area and in neighboring areas.

HSAs may use the data for a number of purposes. The Medicare patient flow data may be used to aid in the definition of the service areas of HSAs. They may also be used to help estimate the effects of changes in the population or in the supply of hospital beds in one area on hospital use in surrounding areas. The information may point out the need for studies of travel times and accessibility of hospital care if it appears that a substantial number of an area's residents use facilities in another area. Because data for more than one year are available, they can be used to study the effects of changes in hospital supply and services on patterns of Medicare patient flow. Finally, the data may help in targeting more detailed patient origin analyses.

The patient destination table shows where the residents of an area receive care. If a substantial number of an area's residents receive care in another health service area, it may be appropriate to emphasize inter-HSA cooperation in planning for the health services for the area's residents. In particular, HSAs may need to work together when studying and making decisions affecting hospital

services and bed supply.

The patient origin table shows the residence of patients of an area's hospitals. If a substantial portion of the caseload in one area is made up of residents of surrounding health service areas, inter-HSA cooperation may once again need to be emphasized when planning hospital services. It is possible that planning decisions in surrounding HSAs could have a pronounced effect on the number of discharges and hospital occupancy in an area's hospitals.

The data on discharges and days of care can be used to compute average length of stay. An HSA may find it useful to compare average length of stay in its hospitals for residents and non-residents (using the patient origin table) and to compare average length of stay for its residents in area and out-of-area hospitals (using the patient destination table). Differences in length of stay may provide clues on the relationship between patterns of hospital use and patterns of patient flow.

The figures on discharges and days of care for an area's residents in the patient destination table may be used with Medicare hospital insurance enrollment data to compute both overall rates of discharges and days of care and rates of hospital

use for residents within their area and in other areas. By studying both rate information and patient flow data, health planners can determine whether changes in patterns of patient flow are related to changes in rates of hospital use. (Because of the shortfall in discharges for the year prior to the cutoff date, caution should be used in interpreting rates for that year.)4

Appendix A Technical Aspects of the Data¹

RELIABILITY

The patient origin and destination statistics are estimates derived from a 20 percent probability sample of Medicare inpatient beneficiaries. Two types of errors can occur when estimates are derived from a sample—sampling and nonsampling.

Nonsampling errors can be attributed to many sources: inability to obtain information about all cases in the sample, mistakes in recording or coding the data, and other errors related to collecting and processing the data.

Sampling error occurs because observations are made only on a sample, not the entire population. The standard error is primarily a measure of sampling error. Approximate standard errors are shown in Tables A through D.

The sample estimate and an estimate of its standard error permit us to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples.

To illustrate, if all possible samples were selected and each of these were surveyed under essentially the same conditions, and if an estimate and its estimated standard error were calculated from each sample, then:

- a. Approximately two-thirds of the intervals from one standard error below the estimate to one standard error above the estimate would include the average value of all possible samples. We call an interval from one standard error below the estimate to one standard error above the estimate a two-thirds confidence interval.
- b. Approximately nineteen-twentieths of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average value of all possible samples. We call an interval from two standard errors below the estimate to two standard errors above the estimate a 95-percent confidence interval.

Information on rates of hospital use by Medicare beneficiaries will be sent to HSAs in a forthcoming paper entitled "Hospital Utilization Rates for Medicare Beneficiaries Aged 65 and Over by Health Service Area, 1974 to 1977," Office of Research, Demonstrations and Statistics, HCFA.

¹ Prepared by James C. Beebe, Health Care Financing Administration.

c. Almost all intervals from three standard errors below the sample estimate to three standard errors above the sample estimate would include the average value of all possible samples.

Thus, for a particular sample, one can say with specified confidence that the average of all possible samples is included in the constructed interval.

To derive estimates of standard errors that would be applicable to a wide variety of items and could be prepared at a moderate cost, a number of approximations were required. As a result, the standard errors presented provide a general order of magnitude rather than the exact standard error for any specific item. In general, estimates for small subgroups and percentages with small bases tend to be relatively unreliable.

The relative sampling error is defined as the standard error of an estimate divided by the estimate. It is a convenient measure of the importance of sampling error of an estimate. The magnitude of relative error that can be tolerated depends on the needs of the user. However, we recommend caution in using estimates with relative errors greater than .10 to .20. The user should be warned that some estimates in the tables exceed these limits.

Table A shows approximate standard errors for the number of discharges. To illustrate its use, assume that health service area X shows a total of 1,000 discharges of residents from health service area Y. The standard error of the 1,000 discharges is found to be 97 discharges.

Table B presents the approximate standard errors of the percent distribution of discharges. Its use requires knowledge of the number of discharges in the base. For example, let us say that 10 percent of the discharges in Area X are discharges of Area Y residents. If the total number of discharges in Area X is 10,000, then the standard error of 10 percent is 0.92 percent.

Tables C and D give standard errors for days of care and percent distributions of days of care and are used with days of care data in ways analogous to the use of Tables A and B with discharge data.

TABLE A

Approximate Standard Error of Estimated Number of Discharges

Estimated Number of Discharges	Standard Error
50	22
100	31
200	43
300	53
400	61
500	69
1,000	97
5,000	220
10,000	300
25,000	480
50,000	670
100,000	940
150,000	1,100
200,000	1,300
250,000	1,500
500,000	2,100
750,000	2,600
1,000,000	3,100
2,000,000	4,900
3,000,000	6,600
4,000,000	8,300
5,000,000	10,000
6,000,000	12,000
7,000,000	13,000

TABLE B

Approximate Standard Error of Percent Distribution of Discharges (Base of percent is total number of discharges.)

Percent			Base o	f Percen	itage (nu	ımber of	Base of Percentage (number of discharges in thousands)	ges in t	housand	ls)		
	2	5	10	25	20	100	250	200	1,000	3,000	5,000	7,000
1 or 99	89:	.43	.31	.19	14.	우.	.061	.043	.030	.017	.013	.011
2 or 98	96.	.6	.43	.27	.19	14	.085	090:	.042	.024	.018	.015
5 or 95	1.50	:92	.67	.42	93	.21	.13	.093	.065	.036	.028	.023
10 or 90	5.06	1.30	.92	.58	.41	.29	.18	.13	860	.049	.037	.031
15 or 85	2.45	1.55	1.09	69.	.49	.34	.21	.15	우.	.058	.043	.035
20 or 80	2.75	1.73	1.22	.77	.54	38	.24	.17	.12	.064	.048	.039
25 or 75	2.97	1.88	1.33	83	.59	4.	.26	.18	.12	890:	.051	.04
30 or 70	3.15	1.99	1.40	88.	.62	44.	.27	19	.13	.072	.053	.043
35 or 65	3.27	2.07	1.46	.92	.63	.45	.28	.20	14	.074	.055	.044
40 or 60	3.36	2.12	1.50	94	99:	.47	.29	.20	14	920.	.056	.045
45 or 55	3.41	2.15	1.52	96:	.67	.47	.29	.20	14	920.	.056	.045
50	3.43	2.17	1.53	96:	.68	.47	.30	.21	14	920.	.056	.045
	The state of the s											-

TABLE C
Approximate Standard Error of Estimated Days of Care

Estimated Days of Care	Standard Error
500	300
1,000	420
5,000	940
10,000	1,300
50,000	3,000
100,000	4,200
200,000	6,000
300,000	7,300
400,000	8,400
500,000	9,400
750,000	12,000
1,000,000	13,000
1,500,000	17,000
2,000,000	19,000
2,500,000	21,000
3,000,000	24,000
5,000,000	31,000
7,500,000	38,000
10,000,000	44,000
15,000,000	55,000
20,000,000	65,000
30,000,000	81,000
40,000,000	96,000
50,000,000	110,000
60,000,000	120,000
70,000,000	130,000
80,000,000	150,000

TABLE D

Approximate Standard Error of Percent Distribution of Days of Care (Base of percent is total number of days of care.)

											-		
Percent				Base	e of Per	of Percentage (total	-	days of ca	are in th	care in thousands)			
	10	20	100	300	200	1,000	3,000	5,000	10,000	30,000	50,000	70,000	90,000
1 or 99	1.32	59	.42	.24	19	.13	920.	650.	.042	.024	010	.016	.014
2 or 98	1.85	.83	.59	.34	.26	.19	Ξ.	.083	.059	.034	.027	.023	.020
5 or 95	2.88	1.29	.91	.53	.41	.29	.17	.13	.092	.054	.042	.036	.032
10 or 90	3.97	1.78	1.26	.73	.56	.40	.23	.18	.13	.075	.059	.051	.045
15 or 85	4.72	2.11	1.50	.87	29.	.48	.28	.22	.15	.091	.072	.062	.055
ō	5.29	2.37	1.68	76.	.75	.53	.31	.24	.17	9.	.081	020.	.063
25 or 75	5.73	2.56	1.81	1.05	.8	.58	.34	.26	19	Ξ.	680.	720.	690.
30 or 70	90.9	2.71	1.92	1.11	98.	.61	.36	.28	.20	.12	.095	.082	.074
35 or 65	6.31	2.83	2.00	1.16	6.	.64	.37	.29	.21	.12	660.	980.	.077
40 or 60	6.48	2.90	2.05	1.19	.92	.65	38	.30	.21	.13	9.	680.	080
or :	6.58	2.95	5.09	1.21	94	99.	33	.30	.22	.13	우.	060:	.081
20	6.62	2.96	2.10	1.21	94	29.	33	30	.22	.13	우.	.091	.082

Appendix B

Health Service Area Redesignations

The health service area designations employed in this report are not always the official ones. The codes used in this report were designated by the Bureau of Health Planning to allow statistics for health service areas to be displayed using county-based data systems (such as the Medicare Statistical System). There are 205 areas resulting from these redesignations. This set of health service area codes is referred to as "data-oriented" health service areas.

SPLIT COUNTIES

In the data-oriented scheme, whenever a county is split among two or more health service areas, data for the entire county are placed in one area. The list below shows how areas with part of a county are defined:

Health Service Area Codes	Counties Included in Data-Oriented Health Service Area
AK 1	All divisions in Alaska are included.
AK 2	Area not defined.
AK 3	Area not defined.
AZ 1	Gila, Maricopa, Pinal
AZ 2	Cochise, Graham, Greenlee, Pima, Santa Cruz
AZ 3	Apache, Cochino, Navajo, Yavapai
AZ 4	Area not defined.
CT 1	Fairfield
CT 2	New Haven
CT 3	Middlesex, New London, Windham
CT 4	Hartford, Tolland
CT 5	Litchfield
IL 6	Area not defined; Chicago is included in Cook.
IL 7	Cook, Dupage
MA 1	Berkshire, Franklin, Hampden, Hampshire
MA 2	Worcester
MA 3	Essex, Middlesex
MA 4	Norfolk, Suffolk
MA 5	Barnstable, Bristol, Dukes, Nantucket, Plymouth
MA 6	Area is not defined; all of Essex and Middlesex Counties are included in MA 003.
NM 1	All counties in New Mexico
UT 1	All counties in Utah
0	All Counties III Otali

INTERSTATE HEALTH SERVICE AREAS

Health service areas that comprise parts of two States are assigned two codes, one for each State. However, in the data-oriented scheme, such areas are listed under only one code. The following list shows how interstate health service areas are designated:

Official Area Codes	Data-Oriented Health Service Area Codes
GA 1, TN 3	TN 3
GA 4, SC 5	GA 4
GA 5, AL 7	GA 5
IA 1, NE 4	IA 1
NE 3, IA 2	NE 3
IA 3, IL 10	IA 3
OH 1, KY 3	OH 1
ND 2, MN 1	ND 2
WI 7, MN 2	MN 2
ND 3, MN 3	ND 3
MO 1, KS 4	MO 1
MO 3, IL 11	MO 3
NY 4, PA 8	NY 4
TN 1, VA 6	TN 1
AZ 4, NM 2, UT 2	Area is not defined.

WHOLE STATE HEALTH SERVICE AREAS

Those areas exempt from designating HSAs are included as whole State health service areas in the data-oriented scheme:

Rhode Island
District of Columbia
Hawaii
Puerto Rico





Health Care Financing

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